The generation of gas from the Barnett Shale is interpreted to occur at greater than 1.10% vitrinite reflectance (%Ro) based on classical thermal maturity interpretations. However, evaluation of gas samples from Boonesville and Barnett reservoirs in Newark East Field suggests that gas has been generated and expelled into Boonesville reservoirs as oil-associated gas, i.e., at lower thermal maturities than the classical gas window. Gas retained and produced from the Barnett Shale does have higher thermal maturities indicative of non-associated gas generation above 1.10%Ro. This suggests episodic expulsion of gas during the main phase of oil generation. There does appear to be a direct relationship of gas flow rates and production decline rates with thermal maturity most likely due to occlusion of permeability by liquid hydrocarbons.

Expulsion of liquid hydrocarbons also has been episodic as Barnett-sourced oil is found in both younger and older horizons as demonstrated by oil fingerprinting and biomarker analysis. Even at low maturity (ca. 0.60%Ro), it expels a high quality (low sulfur, high API gravity) oil, which appears to be a function of the organic matter type and mineralogy. Barnett lithofacies are primarily siliceous and calcareous shales with clay-rich intervals, but cherty and dolomitic units are also common.

Analysis of gas desorbed from canned cuttings is shown to provide an inexpensive tool for logging gas yields (SCF/ton). Further, these data allow assessment of calorific values and inference of thermal maturity. These data combined with routine geochemical analyses allow prediction of the best prospective areas for gas.